

**California Department of Transportation
Pre-Qualified Composite Column Jacket System**

Last updated April, 2019

FRP Type	FRP System Identification	FRP Supplier
E-Glass ¹	TYFO SEH-51 TYFO SEH-51A	Fyfe Co. LLC 3940 Ruffin Road, Suite C San Diego, CA 92123 (858) 642-0694
E-Glass ¹	HEX 3R Wrap 107/HEX 3R Epoxy 300	Hexcel Corporation 1930 North King Street Seguin, TX 78155 (830) 401-8139
E-Glass ¹	SikaWrap 100G/Sikadur Hex 300 SikaWrap 107G/Sikadur Hex 300	Sika Corporation 201 Polito Ave. Lyndhurst, NJ 07071 (800) 933-7452
E-Glass ¹	CSS-CCGF27/CSS-ESS	Simpson Strong-Tie 5151 S. Airport Way Stockton, CA 95206 (800) 999-5099
Carbon	MasterBrace FIB 300/50 CSF	BASF Corporation 889 Valley Park Drive Shakopee, MN 55379 (800) 243-6739
Carbon	REPLARK 30/L700S-LS	Mitsubishi Plastics Composites America, Inc. 401 Volvo Parkway Chesapeake, VA 23320 (757) 382-5844

FRP Type	FRP System Identification	FRP Supplier
Carbon	RenewWrap ESR CF335/ RenewWrap ESR Saturant RenewWrap ESR CF600/ RenewWrap ESR Saturant	Milliken Infrastructure Solutions, LLC 920 Milliken Road, M-153 Spartanburg, SC 29303 (800) 655-6750
Carbon	Tyfo SCH-41 Tyfo SCH-41-2X	Fyfe Co. LLC 3940 Ruffin Road, Suite C San Diego, CA 92123 (858) 642-0694
Carbon	C-Clad FRP Composite System FC061/RN075 LPL	FRP Solutions, Inc. 982 W 10th Street, Azusa, CA 91702 (626) 815-3978
Carbon	SikaWrap 103C/Sikadur Hex 300 SikaWrap 103C 2X/Sikadur Hex 300	Sika Corporation 201 Polito Ave. Lyndhurst, NJ 070701 (800) 933-7452
Carbon	CSS-CCCF11/CSS-ESS CSS-CCCF22/CSS-ESS CSS-CCCF44/CSS-ESS	Simpson Strong-Tie 5151 S. Airport Way Stockton, CA 95206 (800) 999-5099

¹ E-Glass is type E-CR Glass and meets ASTM D578 E-CR Glass

The above fiber reinforced polymer (FRP) composites column casing systems have undergone laboratory testing and are approved for use in limited situations. Advanced composite column casing thicknesses, as shown on the Standard Drawing, are designed to enhance both the shear capacity and increase the lateral confinement of the plastic hinge zone for bridge columns with poor transverse reinforcement details. Material testing standards and provisional specifications have been developed to allow limited field installations for both E-glass (GFRP) and carbon (CFRP) fiber composites, under strict conditions.

Advanced composites systems shall be specified as an alternative if conditions below are satisfied:

1. Displacement ductility demand not more than 6 for circular columns and not more than 3 for rectangular columns. It may be permissible to use advanced composites on circular columns with ductility demands approaching 8, with the written approval of the Earthquake Engineering Branch and the Design Supervisor.
2. For rectangular columns, the longest dimension is limited to a maximum of 36 inches. Rectangular column side aspect ratio shall not be greater than 1.5. For shear deficient only columns, these limits may be exceeded; however, exceeded limits must be approved by the Earthquake Engineering Branch specialist.
3. For circular columns, the diameter must be 72 inches or less.
4. Lap splices do not exist in expected plastic hinge zones.
5. Composites shall not be used for single column bent structures.
6. The total axial load (dead load + overturning) is not greater than $0.15 f'_c A_g$.
7. The columns longitudinal reinforcement ratio is not greater than 2.5%.
8. The bridge does not require flame-sprayed plastic.

Questions regarding the above should be directed to:

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